NOTES.

EVERYONE was sorry to hear of the death of Sir Richard Burton, the eminent traveller and Orientalist. He died on Monday morning at Trieste, where he had been British Consul from 1872. He was in his sixty-ninth year. Burton was one of the boldest and most successful travellers of his time, and produced a great impression on all who knew him by the wide range of his talents, and by his energy and manliness. His career as a traveller began in 1852, when he undertook the journey to Medina and Mecca, of which he afterwards wrote so fascinating an account. His journey with Speke in 1857, which led to the discovery of Lake Tanganyika, placed Burton in the front rank of explorers. He had previously made a successful expedition into Somaliland; and at a later period he did much brilliant work in various districts of Western Africa and in Brazil.

WE regret to have to record the death of the Rev. J. A. Galbraith. He died at his residence in Dublin on Monday. For more than half a century he was connected with the University of Dublin, where he graduated in 1840. In 1844 his distinction as a mathematician secured for him a Fellowship, and in 1854 he was chosen Erasmus Smith Professor of Experimental Philosophy, along with Dr. Haughton. Prof. Galbraith was the author of various excellent scientific manuals.

DR. ALEXANDER WILLIAMSON, who died at Shanghai on August 28, had for 35 years been a member of various missionary bodies, and in his earlier years had travelled far and wide over North China, at a time when the greater part of that Empire was unexplored. His "Journeys in North China" is still a work of interest and value, for he visited many districts which are even still far outside the ambits of the missionary and the traveller, and his great knowledge of China renders the work very instructive. But his main work in life was the establishment in Shanghai of the Society for the Diffusion of Christian and General Knowledge amongst the Chinese, which is, we believe, maintained by subscriptions from various missionary societies labouring in China. Up to the time of his death, he was the editor and chief manager of the Society. Under his superintendence some hundreds of cheap books and pamphlets on all branches of science and on literary topics, suitable to Chinese intelligence and Chinese pockets, have been issued by the Society. Usually these were compiled by specialists amongst the missionaries, but occasionally a book already published abroad would be altered to meet the circumstances of the new circle of readers, and published in Chinese. It thus comes about that if an intelligent Chinese, knowing no language but his own, desires to make a closer acquaintance with that Western knowledge and civilization of which he has probably heard so much—whether it be anatomy, zoology, botany, mechanics, steam, the history of Napoleon Bonaparte, the story of the American War, the tale of Robinson Crusoe, the telegraph, the principles of hygiene—he goes to Dr. Williamson's series of publications and selects what he wants, usually at the price of a few cents or halfpence. The Society under his care has in fact stood as an interpreter between the East and West, and has striven to give to the former all the best that the latter has to give in the way of intellectual and moral instruction. This is surely as beneficent a task as can engage the energies of any man, and in it Dr. Williamson appears to have been most successful.

THE Agent-General for the Cape of Good Hope invites applications from gentlemen of appropriate scientific training and experience, willing to proceed to the Colony for a term of years, there to fill one or other of the undermentioned posts under the Government, viz.:—(1) That of bacteriologist, to investigate the diseases of domestic animals, supposed to be caused by germs. The salary offered is £500 a year. A free first-class passage by steamer (including railway fare to port of embarkation) will be provided. (2) That of toxicologist, to attend chiefly to forensic cases and to investigate South African native plants having medicinal properties. The salary offered is £400 a year. A free first-class passage by steamer (including railway fare to port of embarkation) will be provided. Applications must be accompanied by testimonials, and by copies of any scientific publications the applicants may have issued; and should reach the Agent-General for the Cape of Good Hope (112 Victoria Street, London, S.W.) by November 15 next. They will then be submitted to the authorities in the Colony, with whom the appointments rest.

AT the meeting of the organizing committee of the Oriental Congress held on the 9th inst., at the British Museum, it was resolved that Prof. Max Müller should be invited to preside over the Congress. He has accepted the invitation. Sir Henry Rawlinson, who was to have taken the chair, has been compelled to retire on account of ill-health.

THE Council of the Institution of Civil Engineers have issued a list of subjects on which they invite original communications. For approved papers they have power to award premiums, arising out of special funds bequeathed for the purpose. The Council will not make any award unless a communication of adequate merit is received, but will give more than one premium if there are several deserving memoirs on the same subject. In the adjudication of the premiums no distinction will be made between essays received from members of the Institution or strangers, whether natives or foreigners, except in the case of the Miller and the Howard bequests, which are limited by the donors.

THE nomination list of proposed members of the Council of the London Mathematical Society, for the session 1890–91, which will be submitted to members at the annual meeting on November 13 next, contains the following changes:—Prof. Greenhill, F.R.S., to be President, *vice* Mr. J. J. Walker, F.R.S.; Dr. J. Larmor, Major MacMahon, R.A., F.R.S., and J. J. Walker, F.R.S., to be Vice-Presidents. The proposed new members are Dr. Hirst, F.R.S., R. Lachlan, and A. E. Hough Love, in place of Prof. W. Burnside, Prof. Cayley, F.R.S., and Sir James Cockle, F.R.S., who retire. At the same meeting the retiring President will read an address on "The Influence of Applied on the Progress of Pure Mathematics," and will present the De Morgan Memorial Medal to Lord Rayleigh, Sec.R.S., in recognition of his writings on physical subjects.

HERR J. DÖRFLER has successfully completed his botanical expedition to Albania, and has returned to Vienna. From Ueskueb he crossed Kalkandele to Waica, and accomplished the ascent of both the Kobilica and the Serdarica-Duran.

THE late Dr. Henry Muirhead, of Bushyhill and Longdales, Lanarkshire, gave directions in his will that his estate—subject to certain life-rent provisions and legacies—was to be used for the establishment and maintenance of an institution to be named the Muirhead College, "for the instruction and education of women in medical and biological science, where women might receive an education to fit them to become medical practitioners, dentists, electricians, chemists, &c." The trustees, having obtained probate, have had several meetings, and it is expected that in the course of a few months they will be in a position to announce the arrangements they have been able to make. As the estate consists chiefly of lands, its money value must in the meantime be more or less a matter of opinion. The trustees, however, are hopeful that £30,000 at least will be available for the College.

WE are glad to hear of the continued progress of what is called the University Hall scheme in Edinburgh. Its objects are (1) to make a beginning of social residence among the students of the University, and (2) to associate with this the extension of University influence among the people. The movement was begun in 1887, chiefly by Prof. Geddes. The house in which the experiment has hitherto been carried on having always had its full complement of residents, another house—an old building of considerable historic interest—has been secured; and this was formally opened the other day by the Solicitor-General for Scotland.

AT the eighth meeting of the Congress of Americanists, an interesting address on the peopling of America was given by M. de Quatrefages. He expressed a strong belief in the unity of the human race, and in the consequent facts that the original home of mankind must have been confined to a very limited space, and that the world as a whole has been peopled gradually by processes of migration. He holds that America, like Polynesia, was peopled by colonists from the Old World. The peopling of Polynesia, however, was effected, he thinks, during our Middle Ages, whereas the earliest migrations to America date from geological times.

UNDER the title of "The Partition of Africa," Mr. Stanford will shortly publish a small volume by Mr. J. Scott Keltie, dealing mainly with the events of the past six years, and their results. In an introductory chapter or two, Mr. Keltie will seek to show what has been the footing of Europe in Africa from the earliest times. He will endeavour to estimate the value of the shares of the various European Powers in the scramble, from the point of view of commerce and colonization.

MESSRS. SIMPKIN, MARSHALL, AND CO., have issued the fifth edition of Mr. Rowland Ward's "Sportsman's Handbook to Practical Collecting, Preserving, and Artistic Setting-up of Trophies and Specimens." In the same volume is included a synoptical guide to the hunting-grounds of the world.

THE new number of the *Internationales Archiv für Ethnographie* (Band iii. Heft 4) opens with an interesting paper, by Dr. Ed. Seler, on old Mexican throwing-sticks. Prof. Houtsma contributes notes on some pictures which once served as illustrations of a Persian "Fālbook."

THE University College of Wales, Aberystwith, has published the Calendar for its nineteenth session, 1890–91.

THE Manchester Literary and Philosophical Society has issued the third volume of the fourth series of its Memoirs and Proceedings. Among the memoirs are the following: on the law of cooling, and its bearing on the theory of the motion of heat in bars, by Charles H. Lees; on the combination of hydrogen and chlorine, alone, and in presence of other gases, by Prof. H. B. Dixon, F.R.S., and J. A. Harker; on some applications of caustic soda or potash and carbon in the qualitative and quantitative analysis of minerals, by Dr. C. A. Burghardt; description of a new reflecting telescope and observatory at Bowdon, Cheshire, by Samuel Okell; on the flexure of a flat elastic spring, by Horace Lamb, F.R.S.; and on absorption spectra and a method for their more accurate determination (with eight plates), by Dr. A. Hodgkinson.

THE American Association for the Advancement of Science has issued its Proceedings at the meeting held at Toronto in August 1889.

A BRILLIANT meteor was seen in the northern hemisphere from Edinburgh on Saturday last at 3 a.m. Its advent is said to have been announced by a flash of light which illuminated the whole city. A long fiery streak marked its course, and remained visible for more than a minute.

A REPORT from Honolulu states that an eruption of the volcano Kilauea is feared, as a lava stream has formed lately, and part of it rose 15 metres in one day.

A SHOCK of earthquake was felt at Christiansand, on October 8, at 5.15 a.m. The shock was directed from south to north, and lasted 3 or 4 seconds.

A SLIGHT shock of earthquake was felt at Lisbon on the evening of October 17.

ACCORDING to a telegram sent through Reuter's Agency from Catania on October 18, Mount Etna is in eruption. At the time when the telegram was despatched, a thick column of vapours was rising from the central cone. A slight shock of earthquake had been felt on the eastern side of the mountain at Giarre and its vicinity, where a shower of cinders had also fallen.

PROBABLY the deepest mine in the world (according to *La Nature*) is that at Saint-André du Poirier, in France. Of its two shafts, one 3000 feet, the other 3130 feet, the latter is being sunk to 4000 feet. A remarkable feature of this mine is the comparatively low temperature found in it, never exceeding 24° C. In the gold and silver mines on the Pacific coast, with a depth scarcely half that of French mines, there is great difficulty in keeping a temperature low enough for work. In some parts of the Comstock mines the temperature reaches 48° C.

THE Harveian Oration was delivered by Dr. Andrew on Saturday last at the Royal College of Physicians. In the course of the oration Dr. Andrew referred to the fact that the relationship between physiology and medicine has in many ways greatly changed during the last 250 years, and that such change is a necessary consequence of the progress made by physiology. "The goal of physiology is truth—*e.g.* perfectly trustworthy knowledge of a certain class of facts and laws; and this independently of any use, good or bad, to which that knowledge may be put. The goal of medicine is power—*e.g.* ability to manipulate certain given forces in such fashion as to produce certain effects. No doubt, theoretically, the two ends coincide, and we may hope in some remote future they will do so in reality and perfectly. For the present we must be content with having in one direction much knowledge which confers little or no power, and, on another side, very imperfect knowledge which yet brings with it very great power, too often ill-directed. Again, their methods are different. Physiology by slow degrees has come to rely more and more on purely scientific modes and instruments of research, and to apply them by preference to matters which can be brought to the test of direct experiment. Medicine, on the other hand, has no choice but to remain, so far as it has a scientific side, a science of observation; for anything like effective investigation of the matters with which it deals by direct experiment is impossible. As physiology slowly reduces to order the apparently hopeless confusion of so-called vital actions, the easiest questions are attacked and answered first, and thus those which have to be faced later in their turn are more and more difficult, more and more refractory to scientific analysis. Now, these more difficult questions are often of vital importance to medicine, and in them lie dormant vast possibilities of increased knowledge of the nature of disease, of increased power over it. And yet, from the great difficulty of subjecting them to experiment, physiology may seem for a time to fail us, and the task of employing physiological results to explain clinical facts, or to form the basis of rational treatment, becomes harder than ever."

THE additions to the Zoological Society's Gardens during the past week include a Speke's Antelope (*Tragelaphus spekii* ♀) from Lake Ngami, South Africa, presented by Mr. James A. Nicolls, F.Z.S.; two Reindeer (*Rangifer tarandus* ♂ ♀), European, presented by Colonel W. B. Thomson, F.Z.S.; a Beech Martin (*Mustella foina*) from France, presented by Mr.

H. H. Sharland, F.Z.S. ; two Herring Gulls (*Larus argentatus*), British, presented by Mr. Joseph White ; a Common Chameleon (*Chamæleon vulgaris*) from North Africa, presented by Mr. V. H. Dudmesh ; a White Pelican (*Pelecanus onocrotalus*), South European, deposited ; a Bay Colobus (*Colobus ferrugineus* ♀) from West Africa, purchased ; a Large Hill-Mynah (*Gracula intermedia*) from India, received in exchange.

OUR ASTRONOMICAL COLUMN.

Objects for the Spectroscope.

Sidereal Time at Greenwich at 10 p.m. on October 23 = 0h. 9m. 4s.

Name.	Mag.	Colour.	R.A. 1890.	Decl. 1890.
			h. m. s.	° ′
(1) G.C. 5046	—	—	23 57 36	+15 33
(2) G.C. 5050	—	—	23 58 52	+ 4 35
(3) 30 Piscium	4	Yellowish-red.	23 56 19	− 6 31
(4) δ Andromedæ... ...	3	Yellow.	0 33 24	+30 16
(5) α Andromedæ... ...	1	Bluish-white.	0 2 42	+28 29
(6) W Cygni	Var.	Reddish.	21 31 53	+44 53
(7) T Aquarii...	Var.	Reddish.	20 44 8	− 5 32

Remarks.

(1, 2) Neither of these nebulæ have yet had their spectra recorded. The first is described as "considerably bright ; considerably large ; irregularly round ; very gradually brighter in the middle" : the second as "pretty bright ; very small ; much elongated ; very suddenly much brighter in the middle."

(3) A star of Group II., the spectrum being described by Dunér as "very fine." All the bands 2–9 are very wide, dark, and strongly marked. As the star is a comparatively bright one of this class, a detailed study of its spectrum should be made, special attention being given to the brightness of the carbon flutings, and the presence or absence of dark lines.

(4) Secchi thought this star had a spectrum of Group II., but Dunér and Gothard describe it as one of the solar type, the latter observer, however, stating that it approaches Group II. According to Dunér, D and *b* are strong and dark, and several other lines are distinctly visible. At the place of band 2 (the iron fluting) in Group II. stars there is only a narrow and feeble line. It seems probable that the spectrum greatly resembles that of α Tauri, but as the band in the red has disappeared, it is probably a step higher in temperature. A direct comparison with α Tauri, which can now easily be made, might lead to interesting results as to the changes brought about by an increase of temperature in such a star.

(5) A star of Group IV. The usual observations are required.

(6) There will be a maximum of this variable about October 25. The period is short (120–138 days), and the range is from 5·8–6·2 to 6·7–7·3. The spectrum is an exceptionally fine one of Group II., all the bands being very wide and dark. We do not yet know whether any variations of spectrum accompany the slight changes of magnitude of such a variable as this.

(7) The spectrum of this variable has not yet been recorded. It is one of considerable range (6·7–7·8 to 12·4–12·7), and the period is 203 days. As the magnitude at maximum is not small, the observation of the spectrum should not be difficult. There will be a maximum on October 27. A. Fowler.

Photographs of Nebulæ.—The current number of *Comptes rendus* (October 13) contains a note by Admiral Mouchez on a photograph of the Ring Nebula in Lyra, obtained at Algiers Observatory by MM. Trépied and Rabourdin. The nebula was given an exposure of six hours, in two evenings of three hours each. The negative obtained is said to be very dense, and a positive copy, enlarged 64 times, has been presented to the Paris Academy. With respect to the photograph, Admiral Mouchez remarked :—"This image of the nebula is certainly the largest that has yet been obtained. It shows, in a very striking manner, the distribution of light in this curious celestial object. We see that a region of maximum light exists at each of the extremities of the minor axis of the elliptical ring. These two maxima are not equal, and in each of the halves of the ring the intensity of the light diminishes gradually up to the extremities of the major axis, where it has the smallest value. These are well-known characteristics of this nebula, and such as may be observed by means of ordinary telescopes. But the photographic observation teaches us other things. In fact, according to the work done at Algiers Observatory, when we photograph this nebula with increasing exposures, the nebulosity does not extend sensibly outside the ring, but spreads more and more towards the centre. On the other hand, when we observe the body in a telescope, we find that the central part of the ring is perfectly separated from the ring itself. The interior of the ring is therefore filled with a material difficult to see, but of which the existence is demonstrated in a certain manner by photography. In fact, the central nebulous star attains an intensity in the present proof nearly equal to that of the feeblest maximum of the ring.

"At the meeting of July 7, 1890, in presenting to the Academy a photograph of the same nebula obtained at Bordeaux Observatory by MM. Rayet and Courty with an exposure of three hours, I pointed out the probable existence of three, and perhaps four, extremely feeble stars which had never been previously indicated, and which formed an almost regular square around the central star in the dark part of the nebula. The existence of at least three of these very feeble stars is now demonstrated with absolute certainty, because of the long exposure, but in the enlarged image they are somewhat confused with the inner edge of the nebula."

At the same meeting of the Academy (October 13), M. B. Baillaud presented a plate of the region about the Ring Nebula obtained at Toulouse Observatory on September 8, 9, 10, and 11, with a total exposure of nine hours. The size of the plate was 9 cm. by 12 cm., and it exhibits about 4800 stars to the naked eye within an area of three square degrees.

Stars having Peculiar Spectra.—In *Astronomische Nachrichten*, No. 2997, Prof. E. C. Pickering notes that photographs of stellar spectra taken by Mr. S. J. Bailey, at Closica, in Peru, show several stars having peculiar spectra. The following table contains the places of these stars, and a brief description of the spectrum of each :—

Star.	R.A. 1900.	Decl. 1900.	Mag.	Description.
	h. m.	° ′		
Cord. Gen. Cat. 7191	5 59·4	− 6 42	5·8	F line bright.
,, ,, 18859	13 47·7	− 46 39	6·6	F line bright.
,, ,, 19737	14 29·2	− 41 43	2·5	F line bright.
,, ,, 22855	16 48·4	− 44 57	Var.	G and *h* bright.
Cord. Zone Cat. 3612	17 55·1	− 32 42	9·0	Bright lines.
S.DM, − 19° 4854	18 2·1	− 19 25	9·6	Bright lines.
Anonymous	20 9·4	− 39 29	Var.	Bright hydrogen lines.
Cord. Gen. Cat. 29232	21 13·6	− 45 27	6·0	Type IV.

The spectrum of the two stars with "bright lines" is similar to that of the stars discovered by Wolf and Rayet in Cygnus.

The two variable stars in the above list are new. Their discovery resulted from an examination of photographs of stellar spectra at Harvard College Observatory. A comparison of the intensity of the spectrum of the first-named star, situated in Scorpio, with that of others on the same plate, indicated that it fluctuates between magnitudes 7 and 11·4. A similar comparison of the spectrum of the latter variable, situated in Sagittarius, with the spectra of other stars near it, shows that between May and October 1889 it decreased from 8·5 to 10·7 magnitude. Both the stars have spectra of the same character as Mira Ceti and other known variables of long period.

The Photographic Chart of the Heavens.—The International Committee of the Photographic Chart of the Heavens, will meet at Paris Observatory on March 31, 1891. The last details as to the execution of the work will then be discussed, and it is hoped that all the participating Observatories will be able to begin operations immediately afterwards.

D'Arrest's Comet.—In the same journal Prof. Krueger points out that the comet discovered by Mr. Barnard of Lick Observatory on the 6th inst., is identical with that of the periodical comet of D'Arrest, for which Dr. Berberich computed an ephemeris (*Astronomische Nachrichten*, No. 2959). An observation at Strasburg on the 10th inst. confirms the identity.

A New Asteroid.—Dr. J. Palisa, of Vienna Observatory, discovered a new minor planet (299) on the 7th inst. Its magnitude was 14.